植 物 分 类 学 报 38 (1): 13 ~ 22 (2000)
Acta Phytotaxonomica Sinica

中国石杉属(狭义)蛇足石杉组的分类研究*

张丽兵 孔宪需
(中国科学院成都生物研究所 成都 610041)

Taxonomy of the genus *Huperzia* Bernh. (sen. str.) sect. *Serratae* (Rothm.) Holub in China

ZHANG Li-Bing** KUNG Hsian-Shiu
(*Chengdu Institute of Biology, the Chinese Academy of Sciences*, Chengdu 610041)

Abstract The circumscription of the sect. *Serratae* (Rothm.) Holub of the fern-allied genus *Huperzia* Bernh. (sen. str.) is revised in this paper. Twelve species are recognized, and names of two species and one variety are reduced as synonyms. The tewlve species are *H. serrata*, *H. crispata*, *H. sutchueniana*, *H. liangshanica*, *H. kangdingensis*, *H. delavayi*, *H. kunmingensis*, *H. chishuiensis*, *H. leishanensis*, *H. herterana*, *H. lucidula* and *H. lajouensis*. The three new synonyms are *H. minimadenta* J. F. Cheng, *H. kamaensis* Ching et S. K. Wu 及 *H. lucidula* (Michx.) Trev. var. *asiatica* Ching.

Key words *Huperzia*; Sect. *Serratae*; Revision; Toxonomy; China

摘要 本文对石杉科石杉属(狭义)蛇足石杉组的概念进行了修订并对国产有关种类进行了分类学研究。共记载本组植物12种,并包括3个新异名: *H. minimadenta* J. F. Cheng, *H. kamaensis* Ching et S. K. Wu 及 *H. lucidula* (Michx.) Trev. var. *asiatica* Ching.

关键词 石杉属; 蛇足石杉组; 修订; 分类; 中国

蛇足石杉组 新拟

Huperzia Bernh. sect. **Serratae** (Rothm.) Holub in Folia Geobot. Phytotax. 26: 92. 1991. emend.

Huperzia. sect. *Plananthus* (Mirb. S. F. Gray) Rothm. subsect. *Euselago* (Pritzel) Rothm. ser. *Serratae* Rothm. in Feddes Repert. Sp. Nov. 54: 59. 1944.

Lycopodium L. subgen. *Urostachys* Hert. sect. *Selaginurus* Hert. ser. *Serratae* ("*Serrata*") Hert. in Bot. Jahrb. 43, Beibl. 98: 31. 1909, nom. nud.

Folia margine serrata vel denticulata.

Typus: *Huperzia serrata* (Thunb. ex Murray) Trev.

Sectio cum cir. 20 speciebus in Asia, America et Europa praecipue crescentibus.

叶片边缘有齿。

该组约20种,主产亚、美、欧洲。中国现知12种。

---

* 国家自然科学基金和中国科学院成都地奥科学基金资助项目。
The project was supported by the National Natural Science Foundation of China (NSFC) and the Chengdu Diao Science Fund (DASF).

** Present address: Institut für Spezielle Botanik und Botanischer Garten, Johannes Gutenberg-Universität Mainz, D-55099 Mainz, Germany.

1998-08-17 收稿, 1999-01-25 收修改稿。

分种检索表

1. 叶片卵形至椭圆状披针形,向基部明显变狭,边缘具粗齿。
  2. 叶片边缘不皱曲 ………………………………………………………… 1. **蛇足石杉 H. serrata**
  2. 叶片边缘皱曲 …………………………………………………………… 2. **皱边石杉 H. crispata**
1. 叶片钻形至披针形,向基部变狭或不变狭,边缘具较细的锯齿。
  3. 几乎每一叶片均可见明显的锯齿。
    4. 叶片较短宽,长宽比小于10,通直。
      5. 植株高小于15 cm,上部叶片先端渐尖,纸质,中脉不明显 … 3. **四川石杉 H. sutchueniana**
      5. 植株高达20 cm,上部叶片先端急尖,薄革质,中脉明显 …… 4. **凉山石杉 H. liangshanica**
    4. 叶片细长,长宽比达25,镰状弯曲 ……………………………… 5. **康定石杉 H. kangdingensis**
  3. 许多叶片边缘齿不明显,仅部分叶片前端具微齿。
    6. 叶片(至少植株基部叶片)向基部明显变狭。
      7. 植株基部叶片不为匙形。
        8. 孢子叶与营养叶无明显差别。
          9. 植株高不及12 cm,叶片卵状披针形,顶端急尖,背面拱形,纸质,有光泽 …………………………………………………………………… 6. **苍山石杉 H. delavayi**
          9. 植株高4~17 cm,叶片狭椭圆状披针形,顶端渐尖,背面平展,薄纸质,无光泽 …………………………………………………………………… 7. **昆明石杉 H. kunmingensis**
        8. 叶近二型,孢子叶较营养叶远小;叶片顶端急尖,纸质 …… 8. **赤水石杉 H. chishuiensis**
      7. 植株基部叶片匙形;植株高不及12 cm,植株上部叶片为披针形 …………………………………………………………………… 9. **雷山石杉 H. leishanensis**
    6. 叶片向基部不明显变狭。
      10. 植株高可达20 cm,叶片不斜上抱茎。
        11. 叶片镰状弯曲,宽不及1.0 mm ……………………………… 10. **锡金石杉 H. herterana**
        11. 叶片通直,宽大于1.0~1.2 mm ……………………………… 11. **亮叶石杉 H. lucidula**
      10. 植株高不及8 cm,叶片斜上抱茎 ……………………………… 12. **拉觉石杉 H. lajouensis**

1 蛇足石杉

Huperzia serrata (Thunb. ex Murray) Trev. in Atti Soc. Ital. Sci. Nat. 17: 247. 1874; Rothm. in Feddes Repert. Sp. Nov. 54: 58. 1944; Sen et Sen in Fern Gaz. 11(6): 417. 1978; Ching in Acta Bot. Yunnan. 3(3): 294. 1981; Ching et S. K. Wu in C. Y. Wu, Fl. Xizang. 1: 11. 1983; Nakaike in J. Nat. Hist. Mus. Inst. Chiba 4(1): 14. 1996.—— *Lycopodium serratum* Thunb. ex Murray, Sys. Veg. ed. 14. 1784(May ~ Jul.); B. Ollg. Index Lycop. 70. 1989.—— *L. serratum* Thunb. Fl. Jap. 341, t. 38. 1784(Aug.); Bak. Handb. Fern Allies 30. 1887; Iljin in Kom. Fl. URSS. 1: 114. 1934; Alston in Fl. Indo-Chine 7(2): 548. 1951; 刘慎谔等,东北草本植物志 1: 2, 图 1. 1958; Tagawa, Col. Ill. Jap. Pterid. 9, pl. 1-5-a. 1959; Mehra et Bir in Res. Bull. Panjab Univ. 15(1 ~ 2): 101. 1964; Fl. Tsinling. 2: 15. 1974; Tagawa et Iwatsuki in Fl. Thailand 3(1): 7. 1979; Nakaike, N. Fl. Jap. Pterid. 30, f. 30. 1982; J. L. Tsai et W. C. Shieh in T. C. Huang, Fl. Taiwan 2nd ed. 1: 42. 1994. —— *Urostachys serratus* (Thunb. ex Murray) Herter ex Nessel, Bärlappg. 56. 1939. ——*H. serrata* (Thunb. ex Murray) Rothm. Feddes Repert. Sp. Nov. 54: 59. 1944. ——*H. selago* (L.)

Bernh. ex Schrank et Mart. var. *serrata* (Thunb. ex Murray) Löve et Löve in Univ. Color. Stud. 17: 5. 1965. TYPE: Japan. Thunberg s. n. (UPS-Thunb.)

L. javanicum Sw. Syn. Fil. 175, 399. 1850.——*L. serratum* Thunb. ex Murray var. *javanicum* (Sw.) Makino in Bot. Mag. Tokyo 12: 13. 1898, p. p.; Takeo, Ill. Form. Pl. Suppl. 7, f. 7. 1928. TYPE: Indonesia. Java, Thunberg s.n. (UPS-Thunb. 253208.) (n.v.).

L. serratum Thunb. ex Murray var. *thunbergii* Makino in Bot. Mag. Tokyo 12: 12. 1898.

L. serratum Thunb. ex Murray var. *longipetiolatum* Spring, Monogr. Lycop. 2: 18. 1850; Tagawa, l. c. 10, pl. 1-5-b, f. 2: 5; Devol in Taiwania 11:49, pl. Ⅱ, f.6. 1965 et in H. L. Li, Fl. Taiwan 1: 29. 1975. —— *H. serrata* (Thunb. ex Murray) Trev. f. *longipetiolata* (Spring) Ching in Acta Bot. Yunnan. 3(3): 294. 1981, syn. nov.

L. serratum Thunb. ex Murray var. *myriophyllifolium* Hayata, Ic. Pl. Forms. 4: 133. 1914.——*Urostachs myriphyllifolius* (Hayata) Herter, Index Lycop. 71. 1949 ("*myriophyllus*").——*H. myriophyllifolia* (Hayata) Holub in Folia Geobot. Phytotax. 20: 75. 1985. TYPE: China. Taiwan, Arisan, U. Mori 6208 (TI; Photo, PE).

L. serratum Thunb. ex Murray var. *intermedium* Nakai in Bot. Mag. Tokyo 39: 196. 1925; Tagawa, l. c. 10, f. 3～4. ——*H. serrata* (Thunb. ex Murray) Trev. f. *intermedia* (Nakai) Ching, l. c. 294.——*H. serrata* (Thunb. ex Murray) Trev. f. *intermedia* (Nakai) Ching et S. K. Wu in C. Y. Wu, Fl. Xizang. 1: 11. 1983. SYNTYPE: Japan. Maximowicz s. n., Faurie 3904, etc. (n. v.).

Heilongjiang(黑龙江): Raohe(饶河), S. X. Li *et al*. (李书馨等) 3180. **Jilin**(吉林): Mt. Changbai(长白山), J. J. Qian(钱家驹) 423; Fusong(抚松), Y. L. Zhou *et al*. (周以良等) 1373. **Jiangsu** (江苏): Yixing(宜兴), C. Q. Yuan *et al*. (袁昌齐等) 75015. **Anhui** (安徽): Huangshan(黄山), P. C. Chiu(裘佩熹) 2468; Ningguo(宁国), PE-817109; Mt. Jiuhuan(九华山), s. coll. 5641(PE); Quzhou(衢州), PE-367557(PE); Haozhai(浩寨), B. X. Ye(叶宝兴) 66. **Zhejiang** (浙江): Changhua(昌化), Zhejiang Res. Exp. (浙江资源队) 29672; Mt. Tiantong(天童山), Zhejiang Res. Exp. 28808; Suichang(遂昌), 25766; Tiantai (天台), 28379; Mt. Tianmu(天目山), X. Y. He(贺贤育) 21025; Xiaofeng(孝丰), 24242; Hangzhou(杭州), S. Y. Zhang(章绍尧) 1791; Qingyuan(庆元), P. S. Chiu 3862, 3878; Taishun(泰顺), P. S. Chiu et Y. P. Wu(裘佩熹, 吴依平) 6076, 6292; Longquan(龙泉), M.B.Deng *et al*., (邓懋彬等) 4106; Mt. W. Tianmu(西天目山), P. S. Chiu 5206; Jinxian (鄞县), K. S. Shing *et al*. (邢公侠等) 541; Ninghai(宁海), 48; Yueqing(乐清), Y. D. Chen et P. C. Wu(陈耀东, 吴鹏程) 79; Yunhe(云和), Y. D. Chen et P. C. Wu 58; Jiangshan(江山), 1. **Jiangxi** (江西): Mt. Jinggang(井冈山), J. F. Cheng(程景福) 730100; Xunwu(寻邬), J. F. Cheng 40207; Mt. Lushan(庐山), P. S. Chiu 163; Fengxin(奉新), S. L. Liu *et al*. (刘守炉等) 1363; Qianshan(铅山), s. coll. 4561(PE); Pingxiang(萍乡), Jiangxi Exp. (江西队) 2659; Anfu(安福), Jiangxi Exp. 177; Yifeng(宜丰), S. L. Chen(陈舜礼) 504; Yushan(玉山), M. X. Nie(聂敏祥) 6167; Huanggang(黄岗), s. coll. 1633(PE); Dayu (大余), J. S. Yue *et al*. (岳俊三等) 1378; Guangchang(广昌), Jiangxi Exp. 2408; Ruijin (瑞金), Jiangxi Exp. 3927; Shicheng(石城), Jiangxi Exp. 4557; Shuanglong(双龙), M. X.

Nie 7233; Ninggang(宁岗), S. S. Lai *et al*. (赖书绅等) 5258. **Fujian**(福建): Taining(泰宁), M. S. Li(李明生) 1148; Changting (长汀), Y. D. Chen et P. C Wu 89; Chongan(崇安), P. S. Chiu 1604; Nanjing(南靖), Xiamen Univ. (厦门大学) 539; Shanghang(上杭), D. S. Wang(王大顺) s. n.; Nanping(南平), R. Lin(林容) 2308; Liancheng(连城), R. Lin 3949; Shaxian(沙县), Y. Lin(林英) 662; Jianyang(建阳), Pl. Res. Exp. (植物资源队) 72384; Dehuia(德化), s. coll. 234(PE); Longyan(龙岩), H. B. Chen(陈恒彬) 487. **Taiwan** (台湾): Mt. Alishan(阿里山), T. Kawakami et U. Mori 6208 (photo, PE). **Hubei**(湖北): Lichuan(利川), G. X. Fu *et al*. (傅国勋等) 1708. **Hunan**(湖南): Longshan(龙山), L. H. Liu(刘林瀚) 1766, 1832; Yizhang(宜章), 551; Wugang(武岗), L. H. Liu 15957; Qianyang (黔阳), X. G. Li(李学根) 2915; Mt. Xuefeng(雪峰山), Z. T. Li(李泽棠) 3052; Daoxian (道县), Hengyang Exp. (衡阳队) 61350; Ningyuan(宁远), P. X. Tan(谭沛祥) 62437; Rushan(汝山), B. M. Yang (杨保民) 141; Cili(慈利), Q. Y. Liu(刘前裕) 4143; Hengshan(衡山), s. coll. 5932(PE); Nanyue(南岳), L. H. Liu 15814; Jianghua(江华), B. G. Li et S. B. Wan(李丙贵, 万绍宾) 5136; Baojing(保靖), L. H. Liu 9879. **Guangdong**(广东): Xinyi (信宜), Z. Huang(黄志) 37888; Wuhua(五华), X. G. Li 201680; Zijin(紫金), Z. F. Wei (卫兆芬) 121008; Mt. Luofu(罗浮山), N. K. Chun 41266, 41139; Yangshan(阳山), Yangshan Lechang(乐昌), W. T. Tsang(曾怀德) 20978; Zengcheng(增城), W. T. Tsang 20187; Fengchuan(封川), C. Huang(黄成) 164549; Lianxian(连县), P. X. Tan 60193; Yangshan (阳山), P. X. Tan 60269, S. P. Ko(高锡朋)51025; Ruyuan(乳源), Z. Huang 44311; Xium (修仁), s. coll. 40685(KUN); Longmen(龙门), Z. F. Wei 122026. **Guangxi** (广西): Z. T. Li(李中提) 602470; Mt. Daming(大明山), H. G. Zhou(周厚高) 1569; Pingxiang(凭祥), Beijing Youth Exp. (北京青年队) 936; Longsheng(龙胜), P. S. Chiu 4744; Wuming(武鸣), P. S. Chiu 5007; Mt. Damiao(大苗山), S. Q. Chen(陈少卿) 16841; Longjin(龙津), S. Q. Chen 12816; Lingui(临桂), Y. B. Xu(徐月邦) 10181; Mt. Dayao(大瑶山), Q. H. Lu(吕清华) 4253; Lingle(陵乐), Z. Q. Zhang(张肇骞) 11166; Lingchuan(灵川), Z. Z. Chen(陈照宙) 53760; Binyang(宾阳), Z. Z. Chen 50552; Mashan(马山), S. Q. Zhong(钟树权) A62213; Baise(百色), Guangxi Exp. (广西队) 1843; Mt. Yuanbao(元宝山), S. Q. Chen 16841 ; Huanjiang(环江), S. Q. Chen 15461. **Hainan**(海南): Hainan Exp. (海南队) 703. **Sichuan** (四川): Mt. Emei(峨眉山), Y. X. Xiao(肖永贤) 49015; Dujiangyan(都江堰), S. S. Chian(钱崇澍) 5094 ; Leibo(雷波), H. S. Kung(孔宪需) 5552; Muchuan(沐川), H. S. Kung 5145; Gulin(古蔺), H. S. Kung *et al*. 7030; Mingshan(名山), H. S. Kung 2111; Hongya(洪雅), W. K. Bao *et al*. (包维楷等) 631; Mabian(马边), T. T. Yu(俞德浚) 4198; Hanyuan(汉源), C. S. Liu(刘振书) 487; Ya'an(雅安), Sichuan Econ. Pl. Exp. (川经雅) 429; Tianquan(天全), Sichuan Econ. Pl. Exp. (川经雅) 1015; Nanchong(南充), Sichuan Econ. P1. Exp. (川经南)5339; Junlian(筠连), Sichuan Econ. P1. Exp. (川经宜)42. **Chongqing** (重庆): C. Z. Liu *et al*. (刘承泽等) 10050; Jiangjin(江津), Sichuan Econ. Pl. Exp. 449; Nanchuan(南川), J. H. Xiong(熊济华) 91414; Shizhu(石柱), Y. Chen(陈尧) 2067. **Guizhou**(贵州): Guiyang(贵阳), S. W. Deng(邓世伟) 90044; Songtao(松桃), Sino-

Amer. Exp.(中美队)1954; Yinjiang(印江), Sino-Amer. Exp. 1466; Jiangkou(江口), Sino-Amer. Exp. 587; Anlong(安龙), Guizhou Exp.(贵州队) 4529; Xingren(兴仁), Guizhou Exp. 8288; Kaili(凯里), S. Guizhou Exp.(黔南队) 1719; Pingba(平坝), P. S. Wang(王培善) 1509. **Yunnan**(云南): Kunming(昆明), W. M. Chu et Y. M. Feng(朱维明, 冯永明) 1357; Suijiang / Yongshan(绥江/永善), W. M. Chu 4829; Jingdong(景东); W. M. Chu 5822; Guangnan(广南) W. M. Chu 8068; Lushui(泸水), W. Yunnan Exped.(滇西组)11262; Daguan(大关), W. M. Chu 5173; Fugong(福贡), W. M. Chu et S. G. Lu(朱维明, 陆树刚) 20331; Yuanjiang(元江), D. M. Yamg(杨登满) 45; Tengchong(腾冲), PYU-16727; Zhenkang(镇康), C. W. Wang(王启无) 72379; Yanshan(砚山), C. Y. Wang 84895; Xichou(西畴), C. Y. Wang 85328; Pingbian(屏边), C. Y. Wang 82362; Gongshan(贡山), C. Y. Wang 71805; Eshan(峨山), S. K. Wu(武素功) 117; Malipo(麻栗坡), K. M. Feng(冯国楣) 13814; Wenshan(文山), Y. M. Feng(冯永明)22052; Jinping(金平), X. W. Li(李锡文) 531; Funing(富宁), C. W. Wang 89585; Menglian(孟连), Menglian Exp.(孟连队) 9738. **Xizang(Tibet)**(西藏): Zäyu(察隅), J. W. Zhang(张经纬) 720; Mêdog(墨脱), Plateau Exp.(高原组) 11487, 11561; E. Xizang, G. Forrest 19957, 24166.

全国除西北地区部分省区、华北地区外均有分布;生于海拔 300 ~ 2700 m 的林下、灌丛下、路旁。亚洲其它国家或地区(如日本、朝鲜、泰国、中南半岛、印度、尼泊尔、缅甸、斯里兰卡、菲律宾、马来西亚、印度尼西亚等)、太平洋地区、俄罗斯、大洋洲、中美洲有分布。模式标本采自日本,存于瑞典。

许多蕨类学者在本种下又分数个变种或变型,我们认为,对于这样的广布种,宜采用相对大一点的种的概念,因而本文将有关种下等级予以归并。

该种的定名人应更正为:(Thunb. ex Murray)Trev., 以前的绝大多数文献忽略了。

叶缘具粗齿是本种的识别特征。

2 皱边石杉

Huperzia crispata(Ching ex H. S. Kung)Ching in Acta Bot. Yunnan. 3(3): 293. 1981; H. S. Kung, Fl. Sichuan. 6: 31, f. 4: 1 ~ 3. 1988; B. Ollg. Index Lycop. 11. 1989; P. S. Wang, Fl. Fanjing Mt. 17. 1992; X. Y. Wang in Bull. Bot. Res. 14(4): 354. 1994; C. M. Zhang in W. T. Wang, Keys Vasc. Pl. Wuling Mts. 4. 1995.——*Lycopodium crispatum* Ching ex H. S. Kung in Acta Phytotax. Sin. 18(2): 236, f. 1:3, pl. 6:3. 1980; Bartholomew *et al*. in Journ. Arn. Arb. 64(1): 17. 1983. TYPE: China. Nanchuan, J. H. Xiong 91099(holotype, PE; isotype, SZ)

Jiangxi(江西): Lushan(庐山), W. M. Chu(朱维明) 6931. **Hunan**(湖南): Xinning(新宁), Z. Y. Li *et al*.(李振宇等) 1625; Yizhang(宜章), L. H. Liu(刘林瀚) 551. **Sichuan**(四川): Mt. Gongga(贡嘎山), K. P. Yin(印开蒲) s. n.(CDBI); Hongya(洪雅), s. coll. 631, 774(CDBI); Leibo(雷波), Sichuan Econ. Pl. Exp.(川经队) 283; Luzhou(泸州), 350; Shimian(石棉), C. J. Xie et H.S.Kung(谢朝俊,孔宪需) 40235, 39632, W. G. Hu(胡文光) 1418, 1516; Tianquan(天全), Sichuan Econ. Pl. Exp.1015, F. T. Tai et C. M. Teng(戴蕃瑨, 邓纯眉) 5251; Mt. Emei(峨眉山), Y. W. Ma(马义文) 2580, T. N. Liu(刘慎谔)

10449; Ebian(峨边), W. J. Zheng(郑万均) 6232; Luzhou(泸州), Sichuan Econ. Pl. Exp. 350. **Chongqing**(重庆): Nanchuan(南川), J. H. Xiong(熊济华) 91099, 95413, Mt. Jinfo Exp.(金佛山队) 162, C. L. Li(李朝利) 4611, Z. Y. Liu *et al*.(刘振宇等) 135, H. S. Kung 5089, Z. Y. Liu 1396. **Guizhou**(贵州): S. W. Deng(邓世纬) 51470; Mt. Leigong(雷公山), P. S. Wang(王培善) 76965. **Yunnan** (云南): Yiliang(彝良), N. E. Yunnan Exp.(滇东北队) 785; Suijiang(绥江), Z. H. Hu et H. G. Guo(胡志浩, 郭慧光) 304; Suijiang / Yongshan(绥江 / 永善), W. M. Chu(朱维明) 4962.

我国特有种,产江西、湖南、湖北、四川、重庆、贵州及云南东北部。生于海拔 900 ~ 2600 m 林下荫湿处。

本种叶缘也具粗齿,但叶缘皱曲而与 *H*. *serrata*(Thunb. ex Murray) Trev.不同。

3 四川石杉

Huperzia sutchueniana (Herter) Ching in Acta Bot. Yunnan. 3(3): 297. 1981; H. S. Kung, Fl. Sichuan. 6: 31, pl. 5: 1 ~ 3. 1988; B. Ollg. Index Lycop. 21. 1989; J. F. Cheng in J. F. Cheng et G. G. Zhu Fl. Jiangxi 1: 25, f. 10. 1993; C. F. Zhang in C. F. Zhang et S. Y. Zhang Fl. Zhejiang 1: 2, f. 1 ~ 2. 1993; X. Y. Wang in Bull. Bot. Res. 14(4): 356. 1994.——*Lycopodium sutchuenianum* Herter in Engl. Bot. Jahrb. 43: Beibl. 98: 43. 1909; B. Ollg. Index Lycop. 73. 1989. ——*Urostachys sutchuenianus* Herter in Nessel, Bärlappg. 53. 1939. TYPE: China. Sichuan, Chengkou, alt. 1400 m, Farges 993(P)(n.v.).

L. *serratum* Thunb. ex Murray var. *alpestre* Christ in Bull. Acad. Geogr. Bot. Mans 15: 141. 1906. TYPE: W. China. E. H. Wilson 5408 A.

H. *minimadenta* J. F. Cheng in Bull. Bot. Res. 7(3): 113. 1987 et Fl. Jiangxi 1: 25, f. 9. 1993; B. Ollg. Index Lycop. 16. 1989, syn. nov. TYPE: China. Jiangxi, Mt. Jinggang, S. X. Xu 8310153(holotype, JXU; isotype, PE, frgm. CDBI).

Anhui (安徽): Jinzhai(金寨), Jiangsu Inst. Bot.(江苏植物所) 81350. **Zhejiang**(浙江): P. S. Chiu(裘佩熹) 4291; Longquan(龙泉), P. S. Chiu 4183, Y. D. Chen et P. C. Wu(陈耀东, 吴鹏程) 44; Ruian(瑞安), s. coll. 6589. **Jiangxi** (江西): Mt. Jinggang(井冈山), S. X. Xu(徐声修) 8310153; Mt. Lushan(庐山), P. S. Chiu 2936, 2938, 3014, 3017, 3038, 3090, 3174, H. Migo s. n., R. C. Ching(秦仁昌) 4027, W. M. Chu(朱维明) 6931; Pingxiang(萍乡), J. F. Cheng(程景福) 65714. **Hunan** (湖南): Dongkou(洞口), P. X. Tan(谭沛祥) 62869; Xinning(新宁), Mt. Ziyun Exp.(紫云山队) 321. **Sichuan** (四川): W. Sichuan(四川西部), E. H. Wilson 5408A. **Chongqing** (重庆): Nanchuan(南川), J. H. Xiong(熊济华) 91691, 90175, K. F. Li(李国凤) 63269, Mt. Jinfo Exp.(金佛山队) 1008, 1037, Z. Y. Liu *et al*. (刘振宇等) 5038, Z. Y. Liu 784135; Wuxi(巫溪), K. H. Yang(杨光辉) 58770; Shizhu(石柱), Y. Chen (陈尧)2067; Youyang(酉阳), Z. Y. Liu *et al*. 6186. **Guizhou**(贵州): Daozhen(道真), P. S. Wang(王培善) 77407, 77493 ; Mt. Fanjing(梵净山), P. S. Wang *et al*. 1954.

我国特有种,产安徽、浙江、江西、湖北、湖南、四川、重庆、贵州等省市。生于海拔 800 ~ 2000 m 林下或灌丛下湿地,草地或岩石上。

本种叶片边缘具锯齿,先端渐尖。

4 凉山石杉

Huperzia liangshanica(H. S. Kung) Ching et H. S. Kung in Acta Bot. Yunnan. 3(3): 296. 1981; H. S. Kung, Fl. Sichuan. 6: 35, pl. 6: 1~3. 1988; B. Øllg. Index Lycop. 15. 1989.—— *Lycopodium liangshanicum* H. S. Kung in Acta Bot. Yunnan. 2(1): 100. 1980; B. Øllg. Index Lycop. 53. 1989. TYPE: China. Sichuan, Leibo, under forests, in mosses, alt. 2800 m, H.S.Kung 5552(holotype, SCFI; isotype, CDBI, PE. PYU).

Sichuan (四川): Leibo(雷波), H. S. Kung(孔宪需) 5552.

我国特有种,仅产四川;生于海拔 2800 m 的林下苔藓层中。

本种叶片薄革质,先端渐尖,边缘齿浅而规则。

5 康定石杉

Huperzia kangdingensis(Ching ex H. S. Kung)Ching in Acta Bot. Yunnan. 3 (3): 294. 1981; H. S. Kung, Fl. Sichuan. 6: 35, pl. 7: 1~3. 1988; X. Cheng in W. T. Wang, Vasc. Pl. Hengduan Mts. 1: 1. 1993. ——*Lycopodium kangdingense* Ching ex H. S. Kung in Acta Phytotax. Sin. 18(2): 236, f. 1: 4, pl. 6: 3. 1980; B. Øllg. Index Lycop. 52. 1989. TYPE: China. Sichuan, Kangding, Z. P. Huang *et al*. 1777(holotype, PE; isotype, KUN, SZ).

H. tahkuanensis Ching, l. c. 297; B. Øllg. Index Lycop. 21. 1989. TYPE: China. Yunnan, Daguan, Huanlianhe on moist cliff., alt. 1350 m, W. M. Chu 5121(PYU).

Sichuan(四川): Kangding(康定), Z. P. Huang *et al*.(黄治平等) 1777. **Yunnan**(云南): Daguan(大关), W. M. Chu(朱维明) 5121.

我国特有种,产四川西部及云南东北部;生于海拔 1300~2500 m 的林下湿地或石壁。

6 苍山石杉

Huperzia delavayi (Christ et Herter)Ching in Acta Bot. Yunnan. 3(3): 303. 1981; X. Cheng in W. T. Wang, Vasc. Pl. Hengduan Mts. 1: 2. 1993.—— *Lycopodium delavayi* Christ ex Herter in Bot. Jahrb. Sys. 43: Beibl. 98: 41. 1909; B. Øllg. Index Lycop. 42. 1989. —— *Urostachys delavayi* Herter in Nessel, Bärlappg. 31. Abb. 4., f. 9. 1939. TYPE: China. Yunnan, Dali, Mt. Cangshan, 1884, A. Delavay s. n.(P)(n.v.).

H. herterana auct non (Kümm.)Sen et Sen: Ching, l. c. 296(quod specim. Xizang: Nyalam, Y. T. Zhang *et al*. 3547, PE, KUN).

Yunnan (云南): Yangbi(漾濞), Jinsha Riv.Exped(金江队) 4343; Lushui(泸水), S. K. Wu(武素功)8459; Tengchong(腾冲) S. K. Wu 6975; Gongshan(贡山), W. M. Chu *et al*.(朱维明等) 22419. **Xizang(Tibet)**(西藏): Nyalam(聂拉木), Y. T. Zhang et K. Y. Lang (张永田, 郎楷永) 3547.

我国特有种,产云南西部及西藏南部;生于海拔 2900~3800 m 的山脊杜鹃林下,苔藓丛中,树干、岩石或草地上。

这是个历史上不被熟知的种,其原因是有关的原始描述简单及有关标本积累不多。秦仁昌教授(1981)在其《中国石松的分类》一文中虽描述了这个种,但其分种检索表中却漏写这个种。他在本种之下引用的武素功 4343[应为金沙江队(Jinshajiang. Exped.) 4343]又在该文的 297 页被重复引为 *Huperzia kunmingensis*。我们认为 4343 号应为本种。

7 昆明石杉

Huperzia kunmingensis Ching in Acta Bot. Yunnan. 3(3): 297. 1981; B. Øllg. Index Lycop. 15. 1989. TYPE: China. Yunnan, Kunming, Qiong-zhu-shi, 1953-07-15, T. K. Yian s. n. (PE)

H. austrosinica auct non Ching: X. Y. Wang in Bull. Bot. Res. 14(4): 354. 1994[quod specim. Guizhou: Mt. Leigong, P. S. Wang et B. Liu 77090(PE, PYU)].

Yunnan (云南): Kunming(昆明), T. K. Yian(严楚江) s. n., W. M. Chu et Y. M. Feng(朱维明, 冯永明) 1377, B. Y. Qiu(邱炳云) 54526. **Guangxi** (广西): Huanjiang(环江), S. Q. Chen(陈少卿) 15460. **Guizhou**(贵州): Mt. Leigong(雷公山), P. S. Wang et B. Liu(王培善, 刘兵) 77090.

我国特有种,产广西、云南、贵州;生于海拔 1200~2100 m 的山谷溪边。

本种叶片椭圆状披针形,顶端渐尖,背部平展,薄纸质,无光泽。

8 赤水石杉

Huperzia chishuiensis X. Y. Wang et P. S. Wang in Bull. Bot. Res. 16(4): 417, f. 1~3. 1996. TYPE: China. Guizhou, Chishui, in mosses, alt. 1450 m, S. Z. Fang 5218(holotype, HGAS; isotype, PYU, HGT).

Guizhou(贵州): Chishui(赤水), Suoluo Nature Reserve(桫椤自然保护区), S. Z. Fang (方嗣昭) 5218.

我国特有种,产贵州;生于海拔 1400~1500 m 的苔藓丛中。

本种叶二型,孢子叶比营养叶小得多,叶片顶端急尖,纸质。

9 雷山石杉

Huperzia leishanensis X. Y. Wang in Bull. Bot. Res. 14(4): 355, f. 1~3. 1994. TYPE: China. Guizhou, Mt. Leigong, top of mountain in mosses, alt. 2100 m, Ferns Exped. 91707(holotype, HGAS; isotype, PYU).

Guizhou(贵州): Mt. Leigong(雷公山), Ferns Exp.(蕨类队) 91707.

我国特有种,产贵州;生于海拔 1700~2100 m 的山顶灌木丛下。

本种植株基部叶片为匙形。

10 锡金石杉

Huperzia herterana (Kümm.) Sen et Sen in Fern Gaz. 11 (6): 415, 417, f. 1: k~r. 1978("*herteriana*"); Ching in Acta Bot. Yunnan. 3(3): 296. 1981; Dixit, Lycop. Ind. 53, f. 7A~B, pl. Ⅱ: f. 7. 1988; H. S. Kung, Fl. Sichuan. 6: 35, pl. 5: 4~10. 1988; Bir *et al*. in Ind. Fern J. 6: 32. 1989; B. Øllg. Index Lycop. 14. 1989; X. Cheng in W. T. Wang, Vasc. Pl. Hengduan Mts. 1: 2. 1993. —— *Lycopodium herteranum* Kümm. in Magyar Bot. Lap 26: 99. 1927(1928, "*herterianum*"); H. S. Kung in Acta Phytotax. Sin. 18(2): 237, f. 1: 6. 1980.——*U. herteranus* Herter, In. Lycop. 64. 1949("*herterianus*"). TYPE: Sikkim. Hooker 374(P)(n.v.).

L. sikkimense Herter in Engl. Bot. Jahrb. 43: Beibl. 98: 42. 1909, non Mull. 1861; Mehra et Bir in Res. Bull. Panjab Univ. 15(1~2): 101. 1964; B. Øllg. Index Lycop. 70. 1989.——*Urostachys sikkimensis* Herter in Nessel, Bärlappg. 52. Abb. 7, f. 4. 1939. TYPE: Sikkim. Hooker 374(P)(n.v.).

H. obscure-denticulata Ching in Acta Bot. Yunnan. 3(3): 295. 1981. TYPE: China. Sichuan, Barkam, under forest in mosses, H. S. Kung 2186(PE).

H. multidichotoma Ching, l. c. TYPE: China. Sichuan, Wenchuan, R. L. Li 457(PE).

H. maerhkangensis Ching, l. c. TYPE: China. Sichuan, Barkam, alt. 3600 m, X. Li 71810(holotype, PE; isotype, SZ).

H. kamaensis Ching et S. K. Wu ex Ching, l. c. 300, syn. nov. TYPE: China. Tibet, Kama, under *Abies* forest, alt. 3240 m, Xizang compreh. Exped. 479(PE).

L. lucidulum auct non Michaux: Clarke in Trans. Linn. Soc. II. Bot. 1: 589, pl. 84, f. 1; Christ in Bot. Gaz. 51: 350. 1911; C. Chr. in Acta. Hort. Gotob. 1: 108. 1924.

Sichuan(四川): Meigu(美姑), Veg. Exp.(植被队) 13522; Nanping(南坪), 8818; Barkam(马尔康), H. S. Kung(孔宪需) 2186, X. Li(李馨) 71810; Jinchuan(金川), Z. T. Guan(管中天) 3714 ; Wenchuan(纹川), R. L. Li(李纫兰) 457; Luding (泸定), L. B. Zhang(张丽兵) 895, 1051. **Guizhou**(贵州): Mt. Leigong(雷公山), B. Liu(刘兵) 489. **Yunnan**(云南): Gongshan(贡山), Qinghai-Xizang Exp.(青藏队) 8366. **Xizang**(**Tibet**)(西藏): Gongbo'gyamda(工布江达), F. Ludlow *et al*. 4701; Zäyu(察隅), J. W. Zhang(张经纬) 20; Tingkye(定结), Kama river(卡马河), Tibet Complex Exped.(西藏队) 497.

产湖北、四川、贵州、云南、西藏；生于海拔 2000 ~ 3900 m 的林下荫湿地,苔藓丛中。印度、锡金、不丹有分布。

H. multidichotoma 的模式标本采集人应为李纫兰(R. L. Li)457，原发表时误作李升兰 S. L. Li 457，在此代为改正。

1927 年 Kümm.发表 *L. herteranum* 这一名称时,已指出它即是 *L. sikkimense* Herter non Mull. 1861 的替代者,并未另指 Type。他当时用的加词是"*herteranum*"，而非"*herteriana*"。

这是一个典型的中国-喜马拉雅石杉,其叶片镰状弯曲。

11　亮叶石杉

Huperzia lucidula (Michx.) Trev. in Atti Soc. Ital. Sci. Nat. 17: 248. 1875; Ching in Acta Bot. Yunnan. 3(3): 296. 1981. ——*Lycopodium lucidulum* Michx. Fl. Bor.-Amer. 2: 365. 1803; Hook. in Bot. Misc. 2: 224. 1831; Bak. Handb. Fern Allies 11. 1887; B. Ollg. Index Lycop. 54. 1989. ——*Urostachys lucidulus* (Michx.) Herter ex Nessel, Bärlappg. 49. 1939.—— *H. lucidula*(Michx.)Rothm. in Feddes Repert. Sp. Nov. 54: 59. 1944.TYPE:? Canada.(n.v.)

Plananthus reflexus P. Beauv. Prod. Aeth. 111. 1805. —— *L. reflexum*(P. Beauv.)Sw., Syn. Fil. 175. 1806, non Lam. 1792.

H. lucidula (Michx.)Trev. var. *asiatica* Ching in Acta Bot. Yunnan. 3(3): 296. 1981; J. Z. Wang in Journ. Hebei Forest. Coll. 5(2): 114. 1990, syn. nov. TYPE: China. Jilin, Mt. Changbai, in mosses of forest, alt. 1800 m, S. L. Soong 197(PE).

L. selago auct non L.: 刘慎谔等,东北草本植物志 1: 3, 图 3. 1958.

H. lucidula auct non (Michx.)Trev.: Mehra et Bir in Res. Bull. Panjab Univ. 15(1 ~ 2): 101. 1964.

Jilin (吉林): Mt. Changbai(长白山), S. L. Song(宋士良) 197, X. L. Huang(黄秀兰)

s. n.

产我国东北;生于海拔1800 m的林下苔藓丛中。北美洲有分布。模式标本采自北美。

秦教授在发表 *H. lucidula* var. *asiatica* Ching 时指出,它与原变种的重要区别是,其叶片向下反折,但我们见到产于美国的有些标本,其叶片也是向下反折的[如 USA: N. Carolina, G. E. Edlin 18(PYU)]。我们认为,我国东北的 *H. lucidula* var. *asiatica* Ching 即是原变种。它体现了我国石杉植物区系与北美石杉植物区系间的联系。

12 拉觉石杉

Huperzia lajouensis Ching in Acta Bot. Yunnan. 3(3): 296. 1981; Ching et S. K. Wu in C. Y. Wu, Fl. Xizang. 1: 7. 1983; B. Ollg. Index Lycop. 15. 1989; X. Cheng in W. T. Wang, Vasc. Pl. Hengduan Mts. 1: 2. 1993. TYPE: China. Xizang(Tibet), Zäyu, in muddy pond, alt. 3400 m, C.W.Wang 65861(PE).

Xizang(Tibet)(西藏): Zäyu(察隅), C. W. Wang(王启无) 65861; Riwuduodan(日屋多旦), KUN-582.

我国特有种,产西藏察隅及日屋多旦; 生于海拔3400~4000 m的湿地。

秦教授(1981)发表本种时将它归入叶片边缘全缘的一类,其实本种上部叶片的前端具微齿,明显不同于与之外形接近的 *H. tibetica*(Ching) Ching。

除以上12种外,还有1种即 *Huperzia dixitiana* P. Mondal et R. K. Ghosh in Fern Gaz. 15(2):71~74. 1995, 其 Type 采自锡金。据原作者报导在中国西藏也有分布。因未见到可靠标本,暂留此存疑,以待进一步研究。

致谢 工作中曾得到朱维明教授的帮助、武素功研究员、王培善研究员提供部分文献,并蒙 CDBI、KUN、PE、PYU、SZ 各标本馆给作者查阅标本提供极大方便,在此一并致谢。

Acknowledgements: The authors are grateful to Prof. B. Ollgaard, Botanisk Institut, Aarhus Universitet, Denmark, Prof. J. Holub, Institute of Botany, Academy of Sciences, Czech Republic and Prof. R. E. G. Pichi-Sermolli, Montagnana Val di Pesa, Italia, for providing some reprints of their papers.